

ABSTRACT

ENHANCING THERMAL CONDUCTIVITY OF FLUIDS WITH GRAPHITE NANOPARTICLES AND CARBON NANOTUBES

Fluid compositions that have enhanced thermal conductivity, up
5 to 250% greater than their conventional analogues, and methods of
preparation for these fluids are identified. The compositions
contain at a minimum, a fluid media such as oil or water, and a
selected effective amount of carbon nanomaterials necessary to
enhance the thermal conductivity of the fluid. One of the
10 preferred carbon nanomaterials is a high thermal conductivity
graphite, exceeding that of the neat fluid to be dispersed therein
in thermal conductivity, and ground, milled, or naturally prepared
with mean particle size less than 500 nm, and preferably less than
200nm, and most preferably less than 100nm. The graphite is
15 dispersed in the fluid by one or more of various methods, including
ultrasonication, milling, and chemical dispersion. Carbon nanotube
with graphitic structure is another preferred source of carbon
nanomaterial, although other carbon nanomaterials are acceptable.
To confer long term stability, the use of one or more chemical
20 dispersants is preferred. The thermal conductivity enhancement,
compared to the fluid without carbon nanomaterial, is somehow
proportional to the amount of carbon nanomaterials (carbon
nanotubes and/or graphite) added.